

REMARKS

Claims 1-10 remain pending herein.

Attached hereto as page 9, pursuant to Rule 1.121(c)(1)(ii), is a marked-up version of the amended claims.

In response to Item "4." in page 2 of the May 1, 2002 Office Action, the title of the invention is amended hereby.

Claims 5-8 were rejected under 35 U.S.C. §112, second paragraph. Claims 5-8 are amended as set forth above to address this rejection. Reconsideration and withdrawal of this rejection are requested.

Claims 1, 2 and 9 were rejected under 35 U.S.C. §102(b) over Japanese 10-116 631 (JP '631).

The present invention is directed to a lithium secondary battery comprising an electrode body (including a positive electrode, a negative electrode and a separator) and a non-aqueous electrolytic solution. The non-aqueous electrolytic solution contained in the battery contains water and hydrofluoric acid in a total concentration of 10,000 ppm or less.

As described in the present specification, page 14, lines 10-19, the "total concentration" refers to the sum of (1) water contained in the non-aqueous electrolytic solution, (2) water adsorbed by various battery members (e.g., electrodes) and (3) hydrofluoric acid generated from reaction involving the water in (1) and (2). The water in (2) dissolves in the electrolytic solution after the battery is assembled.

The present specification also describes various methods which can be carried out before filling the electrolytic solution into the battery, for reducing the total concentration of water and hydrofluoric acid (specification, page 14, line 20 - page 15, line 19). As mentioned in the specification, page 14, lines 4-9, the total concentration does not refer to the concentration in the non-aqueous electrolytic solution before filling in the battery, but instead refers to the total concentration in the non-aqueous solution after filling the electrolytic solution in the battery.

JP '631 fails to disclose or suggest any limit on the concentration of water adsorbed by the battery members (i.e., source (2) of water, described above). In addition, JP '631 does not disclose or suggest accounting for such water in any way. Such water dissolves in the electrolytic solution after the battery is assembled, as noted above. JP '631 fails to disclose or suggest

analyzing the concentration of water and/or hydrofluoric acid in the electrolytic solution after filling the electrolytic solution into the battery. Rather, JP '631 addresses only the concentration of water contained in the electrolytic solution prior to the electrolytic solution being filled in the battery.

In view of the above, JP '631 fails to disclose or suggest a battery as recited in claim 1, wherein the non-aqueous electrolytic solution contains water and hydrofluoric acid in a total concentration of 10,000 ppm or less. Accordingly, claim 1, and claims 2 and 9, each of which depend from claim 1, are allowable over JP '631. Accordingly, reconsideration and withdrawal of this rejection are requested.

Claims 3 and 4 were rejected under 35 U.S.C. § 103(a) over JP '631 in view of U.S. Patent No. 5,807,646 (Iwata '646).

Iwata '646 is apparently relied on in the Office Action for alleged disclosure of lithium-manganese oxide. Accordingly, the alleged disclosure in Iwata '646 which is relied on in the Office Action fails to overcome the shortcomings of JP '631 as attempted to be applied against claim 1, from which claims 3 and 4 each ultimately depend. Accordingly, reconsideration and withdrawal of this rejection are requested.

Claims 5 and 6 were rejected under 35 U.S.C. § 103(a) over JP '631 in view of U.S. Patent No. 5,792,577 (Ejiri '577).

The Office Action appears to rely on Ejiri '577 for alleged disclosure of graphitized carbon fibers. Accordingly, the alleged disclosure in Ejiri '577 relied on in the Office Action would fail to overcome the shortcomings of JP '631 as attempted to be applied against claim 1, from which claims 5 and 6 ultimately depend. Accordingly, reconsideration and withdrawal of this rejection are requested.

Claims 7 and 8 were rejected under 35 U.S.C. § 103(a) over JP '631 in view of Iwata '646 and Ejiri '577. Iwata '646 and Ejiri '577 are apparently relied on in the Office Action for the disclosure discussed above. Accordingly, as discussed above, Iwata '646 and Ejiri '577 fail to overcome the shortcomings of JP '631 as attempted to be applied against claim 1, from which claims 7 and 8 each ultimately depend. Accordingly, reconsideration and withdrawal of this rejection are requested.

Claim 10 is rejected under 35 U.S.C. § 103(a) over JP '631 in view of U.S. Patent No. 5,709,968 (Shimizu '968) or U.S. Patent No. 6,053,953 (Tomiyama '953).

Shimizu '968 and Tomiyama '953 are apparently relied on for alleged disclosure of use of lithium batteries in electric automobiles. Accordingly, the alleged disclosure relied on in Shimizu '968 and Tomiyama '953 would fail to overcome the shortcomings of JP '631 as attempted to be applied against claim 1, from which claim 1 depends. Reconsideration and withdrawal of this rejection are requested.

Claim 10 was rejected under 35 U.S.C. §103(a) over Tomiyama '953 in view of JP '631. As discussed above, the disclosure in Tomiyama '953 relied on in the Office action fails to overcome the shortcomings of JP '631 as attempted to be applied against claim 1, from which claim 10 depends. Accordingly, reconsideration and withdrawal of this rejection are requested.

Claims 1-10 were provisionally rejected for obviousness-type double patenting over claims 1-8 and 12 of copending U.S. Patent Application Ser. No. 09/770,725 in view of JP '631, German 198 27 631 (DE '631) or WO 99/33471 (WO '471).

As discussed above, JP '631 fails to disclose or suggest a battery as recited in claim 1, wherein the non-aqueous electrolytic solution contains water and hydrofluoric acid in a total concentration of 10,000 ppm or less. DE '631, like JP '631, merely discloses concentrations of water and hydrofluoric acid in electrolyte which has not yet been filled into a battery. Accordingly, like JP '631, DE '631 fails to disclose or suggest a battery as recited in claim 1, wherein the non-aqueous electrolytic solution contains water and hydrofluoric acid in a total concentration of 10,000 ppm or less.

Similarly, WO '471, like JP '631, , merely discloses concentrations of water and hydrofluoric acid in electrolyte which has not yet been filled into a battery. Accordingly, like JP '631, DE '631 fails to disclose or suggest a battery as recited in claim 1, wherein the non-aqueous electrolytic solution contains water and hydrofluoric acid in a total concentration of 10,000 ppm or less.

U.S. Patent Application Ser. No. 09/770,725 is apparently relied on in the Office Action for subject matter other than subject matter relating to the recitation in claim 1 that the non-aqueous electrolytic solution contains water and hydrofluoric acid in a total concentration of 10,000 ppm or less.

Accordingly, none of the applied references, or any combination thereof, discloses or suggests a lithium secondary battery comprising a non-aqueous electrolytic solution containing water

and hydrofluoric acid in a total concentration of 10,000 ppm or less, as recited in claim 1.

In view of the above, claims 1-10 are in condition for allowance.

If the Examiner believes that contact with Applicant's attorney would be advantageous toward the disposition of this case, the Examiner is herein requested to call Applicant's attorney at the phone number noted below.

The Commissioner is hereby authorized to charge any additional fees associated with this communication or credit any overpayment to Deposit Account No. 50-1446.

Respectfully submitted,

August 1, 2002

Date



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

LITHIUM SECONDARY BATTERY CONTAINING A NON-AQUEOUS
ELECTROLYTIC SOLUTION WITH A LIMIT ON THE TOTAL
CONCENTRATION OF WATER AND HYDROFLUORIC ACID



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

5. (Amended) A lithium secondary battery according to claim 1, wherein a highly graphitized carbon fiber is used as the negative electrode active substance.

6. (Amended) A lithium secondary battery according to claim 2, wherein a highly graphitized carbon fiber is used as the negative electrode active substance.

7. (Amended) A lithium secondary battery according to claim 3, wherein a highly graphitized carbon fiber is used as the negative electrode active substance.

8. (Amended) A lithium secondary battery according to claim 4, wherein a highly graphitized carbon fiber is used as the negative electrode active substance.